



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/983,074	10/23/2001	Eiichi Tamaki	50099-185	8954

7590 03/09/2004
MCDERMOTT, WILL & EMERY
600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER

PHAM, HAI CHI

ART UNIT	PAPER NUMBER
----------	--------------

2861

DATE MAILED: 03/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/983,074

Applicant(s)

TAMAKI, EIICHI

Examiner

Hai C Pham

Art Unit

2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 11-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. The indicated allowability of claims 15-18 is withdrawn in view of the newly discovered reference to Bloom et al. (U.S. 5,311,360). Rejections based on the newly cited reference follow.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujan et al. (U.S. 6,084,626) in view of Bloom et al. (U.S. 5,311,360).

With regard to claims 1, 5 and 7, Ramanujan et al. discloses a laser printer comprising a laser source for emitting a first laser beam (laser diode 11 emitting linearly polarized light), a first optical system (wave plate 29) for converting the first laser beam into a second laser beam, a diffraction grating light valve (grating modulator array 40) having a plurality of reflective elements arranged in a predetermined direction (the individual diffraction gratings containing within each modulator site being arranged along the z-axis) (col. 12, lines 33-37) for converting the second laser beam into modulated signal beams, and a second optical system (deflector 30) for directing the

signal beams onto a medium (media plane 90), wherein the second laser beam is linearly polarized in a direction parallel to the predetermined direction (the incident light beam being polarized along the z-axis to match the axis of polarization of the modulator) (col. 10, lines 7-8 and col. 12, lines 37-40).

With respect to claim 5, although Ramanujan et al. ('626) does not expressly teach the wave plate (29) being a half-wave plate, Ramanujan et al. does however indicate that the "wave plate 29 *can* be placed prior to the grating modulator array ... to modify the incident polarization (col. 7, lines 3-5) such that the first laser beam is linearly polarized in a direction matching the orientation of the grating elements of the modulator (col. 10, lines 7-15 and col. 12, lines 33-40), meaning that either the laser source is arranged so that the linearly polarized laser beam match the electric-field orientation of the individual grating elements of the modulator array or a proper wave plate is used and that would include a half-wave plate to provide a proper incident light polarization. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a half-wave plate in the device of Ramanujan et al. for the purpose of modifying the incident polarization of the laser beam to match with that of the grating modulator array.

However, Ramanujan et al. fails to teach the plurality of reflective elements including a ribbon-shaped fixed reflective element and ribbon-shaped movable reflective element.

Regardless, it is well known in the art that a variety of spatial light modulators can be used to modulate an incident light beam, which include ferroelectric liquid crystal and

electromechanical type modulators as evidenced by Bloom et al., which teaches the provision of a diffraction grating (30) as a preferred light modulator comprising a plurality of equally spaced fixed elements (32) and movable elements (34), each of which features a light reflective planar surface (col. 6, line 48 to col. 7, line 12), such diffraction grating being known for its high resolution, high response time and high contrast ratio.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to incorporate the reflective, deformable grating light modulator as taught by Bloom et al. in the device of Ramanujan et al. The motivation for doing so would have been to provide a light modulator with a high optical throughput and a tolerance for high optical power as suggested by Bloom et al. at col. 10, lines 17-27.

With regard to claims 2-3, Ramanujan et al. teaches the first optical system being a polarization direction converter or a phase plate (wave plate 29) for converting a polarization of the first laser beam (col. 12, lines 37-40).

4. Claims 4, 6, 8-9, 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ramanujan et al. in view of Bloom et al., as applied to claims 1-3, 5, 7 above, and further in view of Reznichenko et al. (U.S. 6,229,650 B1).

Ramanujan et al., in view of Bloom et al., discloses all the basic limitations of the claimed invention including the diffraction grating modulator producing a zero-order diffracted light beam (the slit in the spatial filter 86 allowing only zero-order diffracted light beam to pass through so as to be imaged on the recording medium by the print

lens 82) (Figs. 3-4), but except for the peak wavelength of the laser diode array being set within the range of 800-820 nm.

Reznichenko et al. discloses an optical imaging system comprising a laser light source (102) for emitting a first laser beam, a diffracting grating light valve (GLV 110) for modulating the first laser beam in response to an image signal to produce a zero-order diffracted signal beam (the higher ordered diffracted light beams being blocked by the stop 114) (Fig. 3), an imaging optical system (lens groups 112, 116) for irradiating said recording medium (imaging medium 200) with said zero-order diffracted signal beam (col. 4, line 36 to col. 5, line 9).

Although Reznichenko et al. does not expressly disclose the peak wavelength of the laser source being within the range of 800-820 nm, Reznichenko et al. does however teach that the GLV modulator can be adapted to different wavelengths (col. 6, line 52 to col. 7, line 6), and that an appropriate laser light source with a specific wavelength would be required in accordance with the type of recording medium being used (col. 3, lines 9-14). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select an appropriate wavelength range for the laser light source, namely from 800 to 820 nm as claimed, in the modified device of Ramanujan et al. as suggested by Reznichenko et al., since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

On the other hand, with regard to claim 13, although Ramanujan et al. does not explicitly teach the wave plate (29) being a half-wave plate, Ramanujan et al. does indicate that the "wave plate 29 *can* be placed prior to the grating modulator array ... to modify the incident polarization (col. 7, lines 3-5) such that the first laser beam is linearly polarized in a direction matching the orientation of the grating elements of the modulator (col. 10, lines 7-15 and col. 12, lines 33-40), meaning that either the laser source could be arranged so that the linearly polarized laser beam match the electric-field orientation of the individual grating elements of the modulator array or the use of a proper wave plate that would include a half-wave plate to provide a proper incident light polarization. Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a half-wave plate in the device of Ramanujan et al. for the purpose of modifying the incident polarization of the laser beam to match with that of the grating modulator array.

Response to Arguments

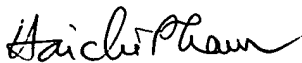
5. Applicant's arguments with respect to claims 1-9 and 11-14 have been considered but are moot in view of the new grounds of rejection presented in this Office action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (571) 272-2260. The examiner can normally be reached on T-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen D. Meier can be reached on (751) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



HAI PHAM
PRIMARY EXAMINER

February 23, 2004